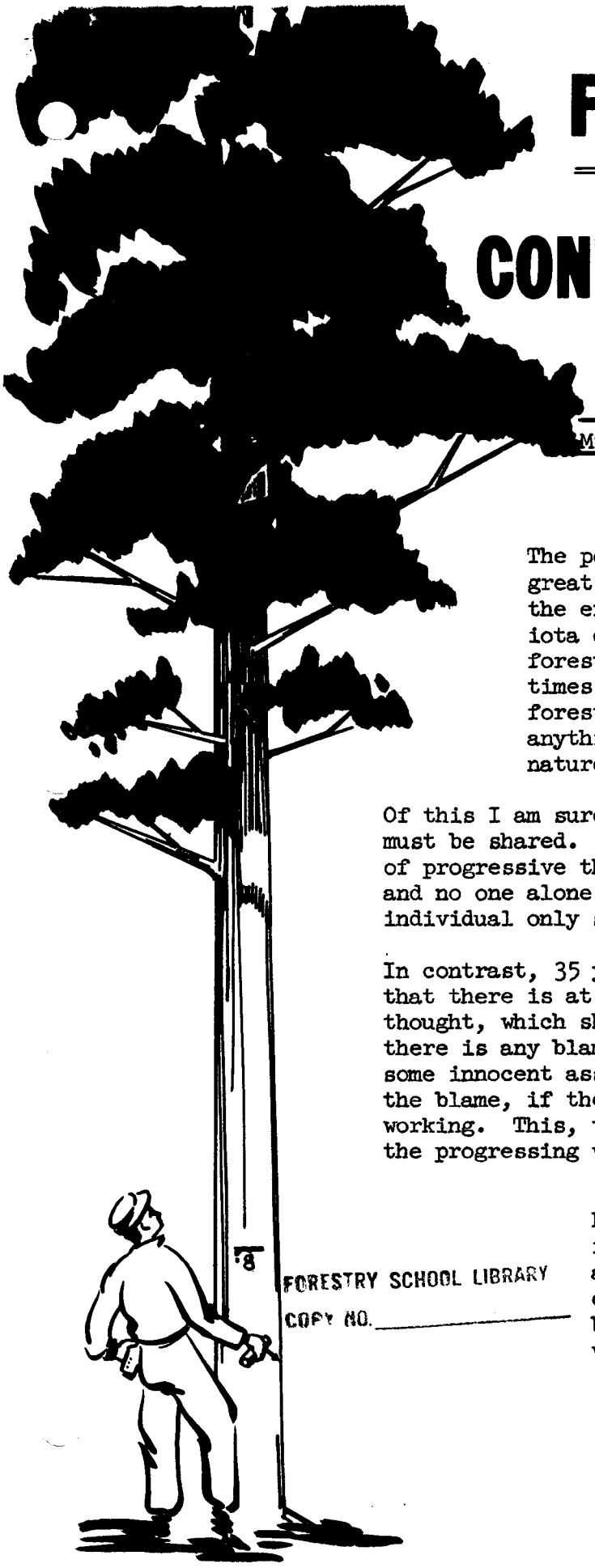


FOREST CONTROL by CONTINUOUS INVENTORY

"Today I have grown taller from walking with the trees."
...Karle Wilson

Milwaukee, Wis. March, 1960 No. 72

THE POWER TO PRODUCE

The power of the forest to grow is a force of great and wondrous magnitude. How meager are the efforts of mere, muddling man to alter one iota of it. But man does try to improve the forest, and in the effort human conflicts sometimes arise. These conflicts often make the forester wonder if he really has contributed anything worthwhile to the wonderful ways of nature or to the lot of man.

Of this I am sure; credit for anything good that is done must be shared. There is, at all times, a fine effluvia of progressive thought present in the affairs of mankind and no one alone is ever fully responsible for it. The individual only shares the cause and the effect.

In contrast, 35 years of dirt forestry have taught me that there is at least one equally strong though contrary thought, which should be every man's rule and guide. If there is any blame hasten to take it upon yourself lest some innocent associate suffer. Share the credit but take the blame, if there really is any, and then keep right on working. This, too, is nature's way as the history of the progressing world clearly shows us.

Life is grand, and so are its environments of Past and Future. Would the face of Nature be so serene and beautiful if Man's destiny were not equally so?

Henry Thoreau

CAL STOTT *The Forester*

FOREST SERVICE U.S. DEPARTMENT OF AGRICULTURE

The Port-a-Punch Card and Layout Techniques

In recent months we have had many requests for assistance in "laying out" the printed Port-a-Punch form for CFI field cards. This is a simple enough procedure when you know and understand the basic limitations. This newsletter will bring to mind the currently important items that should influence the card layout.

The IBM Port-a-Punch card is available with up to 40 columns of pre-scored positions. As a matter of fact, the only standard card stocked by the company is the 40-column card, (available in either a plain card or general purpose card divided into 8 fields of equal size). We find that this card is adequate for inventory needs but we would strongly recommend the ordering of a special card to suit the particular job being done. More explicitly, it is important that a portion of the card be free of pre-scored positions. It is this "free" or blank area that is used to contain machine produced data from previous measurements so the data will be available for field comparison at remeasurement time. The fact that it is impossible to reproduce data in the area between pre-scored columns is what makes this blank area so important. The size of the blank area needed is determined by the kinds of information wanted in the field at remeasurement time, and the number of columns needed to make this information available.

Port-a-Punch cards are generally available in multiples of 5 columns, (5, 10, 15, etc.).* Only the column corresponding to the even numbered columns in the standard 80-column card is used, (22, 24, 26, 28, etc.). Blanks are necessary between the pre-scored punches as the holes are wider than ordinary. When designing pre-scored punches, all must be grouped into one large field and must either start in column 2 at the left of the card or else end in column 80 at the right side of the card. This then means that the blank area must either be on the extreme left-hand side of the card or else the extreme right-hand side of the card. (You should never have two groups of pre-scored punches separated by a blank area). In either case, the width of the pre-scored punches precludes the use of the odd-numbered column immediately adjacent to either the first or last column of the pre-scored portion of the card. This is shown in column 21 on the attached example of a typical card layout.

The data reproduced in the blank portion are generally interpreted at the top of the card to permit easy reference in the field. It is possible to interpret these data on either of two lines but it is better to use the lower line. This makes the printed numbers completely visible when the card is in the Port-a-Punch board. Never plan on using two lines for interpreting data. This creates costly and unnecessary handling of the cards.

It is quite possible that some companies may wish to machine reproduce data from an existing card source directly into the pre-scored positions in a Port-a-Punch card, and thus create the start of a new card source. This would, under certain circumstances, eliminate the hand punching of some of the data to be recorded in the field.

*Port-a-Punch cards can be obtained in other than multiples of 5 columns, but these are available only on special quotations.

It is entirely possible to do this. In so doing, a fuzzy edge is created on the punched hole. The IBM Company tells us that this should not be bothersome to the machines even when handling a large number of cards.

The printing of separate headings over the fields in the cards should be done in a vertical or horizontal manner. Avoid the printing of diagonal headings over the different fields.

If you wish to block out certain numbers which represent impossible codes, do so with a cross-hatch. Never block out codes with a solid overprint. The numbers blocked out in any column should at all times be readable through the blocking.

Always try to have a few columns of pre-scored positions left blank. It is good to have these columns available to add additional information to your survey.

Have the 11 and 12 positions pre-scored along with the 0 through 9 codes.

Never plan or attempt to key punch or verify any data in a Port-a-Punch card. The read side of both these machines will push out all pre-scored punches in every column.

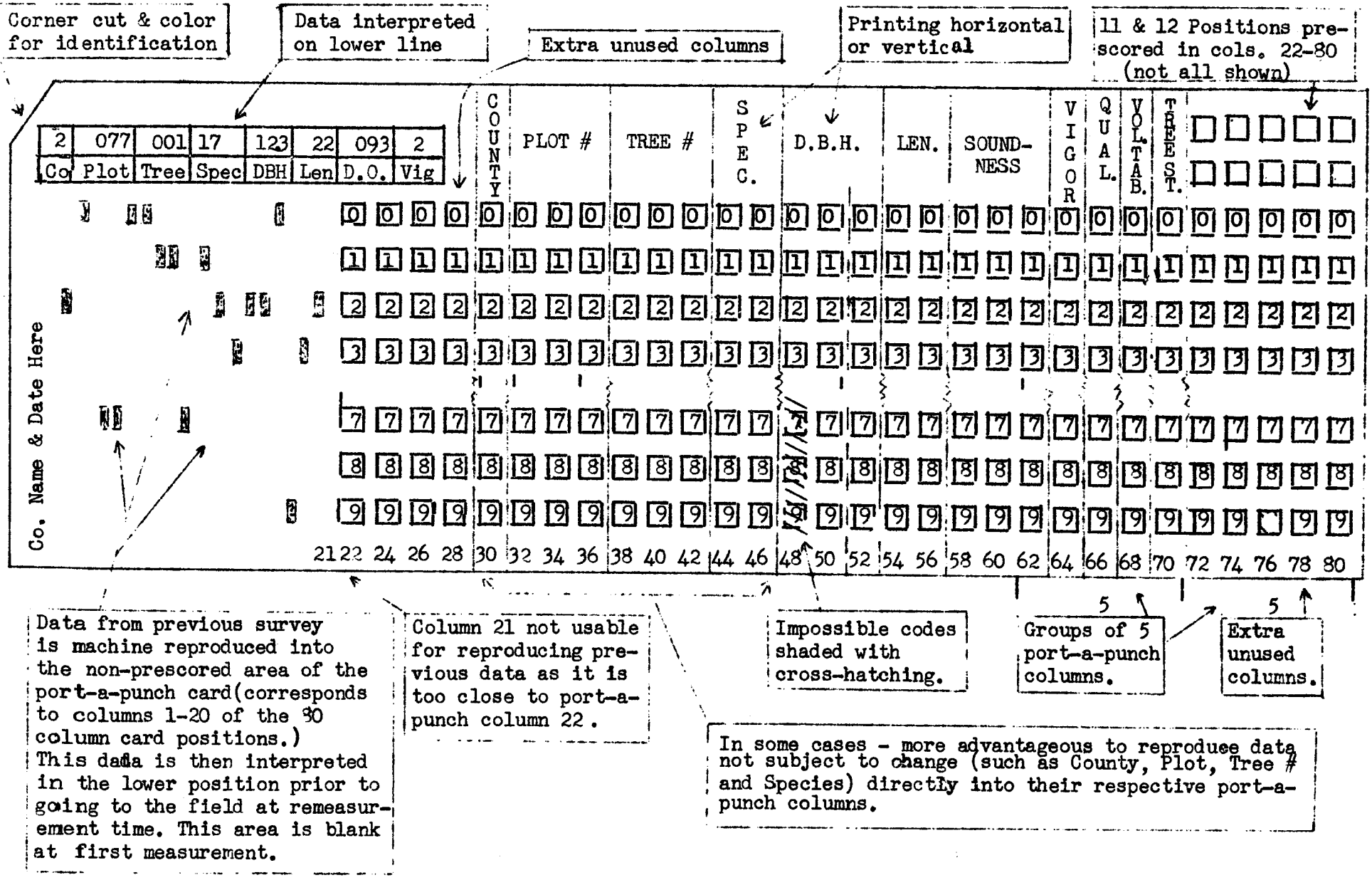
Even though it is sometimes possible to get all the plot master information as well as the tree detail information in one card, we strongly recommend the use of two cards - one for the plot master information, and one for the tree detail information. This eliminates unnecessary crowding and facilitates some of the machine procedures. The difference between master and detail cards should be very evident when working with cards in the field. Different corner cuts are used on these for identification purposes. In addition to this, a different color is used for each type of card. A solid color is preferable to colored stripe at the top of the card.

It is sometimes necessary to make corrections in Port-a-Punch cards after they are punched (this may be either in the field or in the office). This is done by superimposing the punched card on top of an unpunched card. All columns are reproduced by hand, together with the needed correction. When doing this, it is difficult to see the holes to punch when both cards are the same color. For this reason most people find it convenient to order some detail cards on different color stock. This makes error corrections quite easy.

Cards printed from a prepared plate should contain company name and date.

George Semmens
Div. of State & Pri. For.

TYPICAL PORT-A-PUNCH CARD LAYOUT



Data from previous survey is machine reproduced into the non-prescored area of the port-a-punch card(corresponds to columns 1-20 of the 80 column card positions.) This data is then interpreted in the lower position prior to going to the field at remeasurement time. This area is blank at first measurement.

Column 21 not usable for reproducing previous data as it is too close to port-a-punch column 22.

Impossible codes shaded with cross-hatching.

Groups of 5 port-a-punch columns.

Extra unused columns.

In some cases - more advantageous to reproduce data not subject to change (such as County, Plot, Tree # and Species) directly into their respective port-a-punch columns.

STATISTICAL PROCEDURE LEAFLET #4 3/21/60

HOW TO CALCULATE THE LIMIT OF ERROR

Occasionally, the average volume calculated from a set of sample plot records is exactly correct. Usually, the calculated volume is greater than, or less than, the true volume. We never know, nor can we calculate, the actual error. We can and do calculate a limit beyond which there is little likelihood that our error will go. When the size of the calculated limit is small, in comparison with the calculated average volume itself, we consider our calculated average volume to be good, and usable. When the limit is large, we know that there may be a large error in our calculated average volume. Even so, we still do not know that a large error exists nor what the exact amount of error may be.

The first step in exploring the limits which confine our error is to determine the Standard Error. This is easily calculated from the Standard Deviation and the number of sample plots.

$$\text{Standard Error} = \frac{\text{Standard Deviation}}{\sqrt{\text{Number of sample plots}}}$$

With data from our last example 1/

$$\text{Standard Error} = \frac{\pm 1.109 \text{ cords}}{\sqrt{12 \text{ plots}}}$$

$$= \frac{\pm 1.109}{3.464} \text{ or } \pm 0.320 \text{ cords}$$

To express a measure of accuracy for our calculated average volume, the Standard Error is related to it as a percent. This percent we call the Standard Error %.

$$\text{Standard Error (\%)} = \frac{\text{Standard Error}}{\text{Calculated Average Volume}}$$

$$= \frac{\pm 0.320 \text{ cords}}{3.140 \text{ cords}} \text{ or } \pm 10\% \text{ with a probability of 68\%}$$

We now know that the population mean will fall within plus or minus 1 Standard Error ($\pm$ 0.320 cords or $\pm$ 10%) of the sample mean. This is a probability of 2 out of 3 chances, so it is also clear that there is 1 chance out of 3 that the error will exceed this. This is a statement of the probable accuracy of our cruise. But we usually wish to express the Standard Error in % with greater confidence than this 2 to 3 chance, (68% probability). We prefer to use a 95% probability, or 22 chances out of 23 that our error will not exceed twice the Standard Error.

$$\text{Standard Error (\%)} = \frac{2 \times \text{Standard Error}}{\text{Calculated Average Volume}}$$

$$= \frac{2 \times (\pm 0.320 \text{ cords})}{3.140 \text{ cords}}$$

$$= \frac{\pm 0.640}{3.140} \text{ or } \pm 20\% \text{ with a probability of 95\%}$$

1/ See C.F.I. Newsletter #71, February, 1960 - Statistical Procedure Leaflet #3

William Warren Barton. Forester. U.S.F.S., Region 7

A GUIDE TO THE TOP DIAMETERS OF LOGS IN STANDING SAWLOG TREES
A CFI TRAINING TOOL

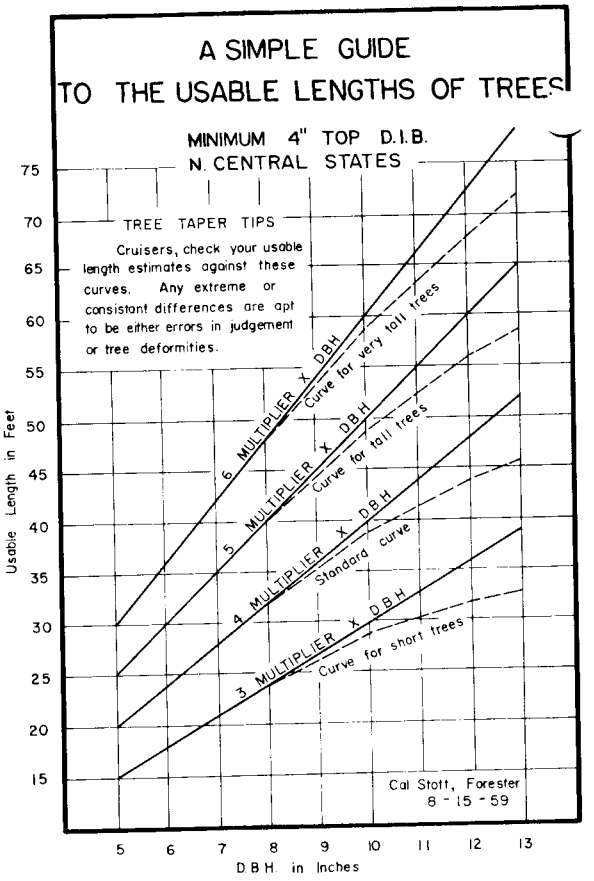
GIRARD FORM CLASSES 79, 75 and 70 — U.S.FOREST SERVICE R-9
BASI[illegible]FORMATION FROM TABLE 19 BUL. 1104 BY GEVORKIANTZ AND OLSEN OF THE L.S.F.E.S.

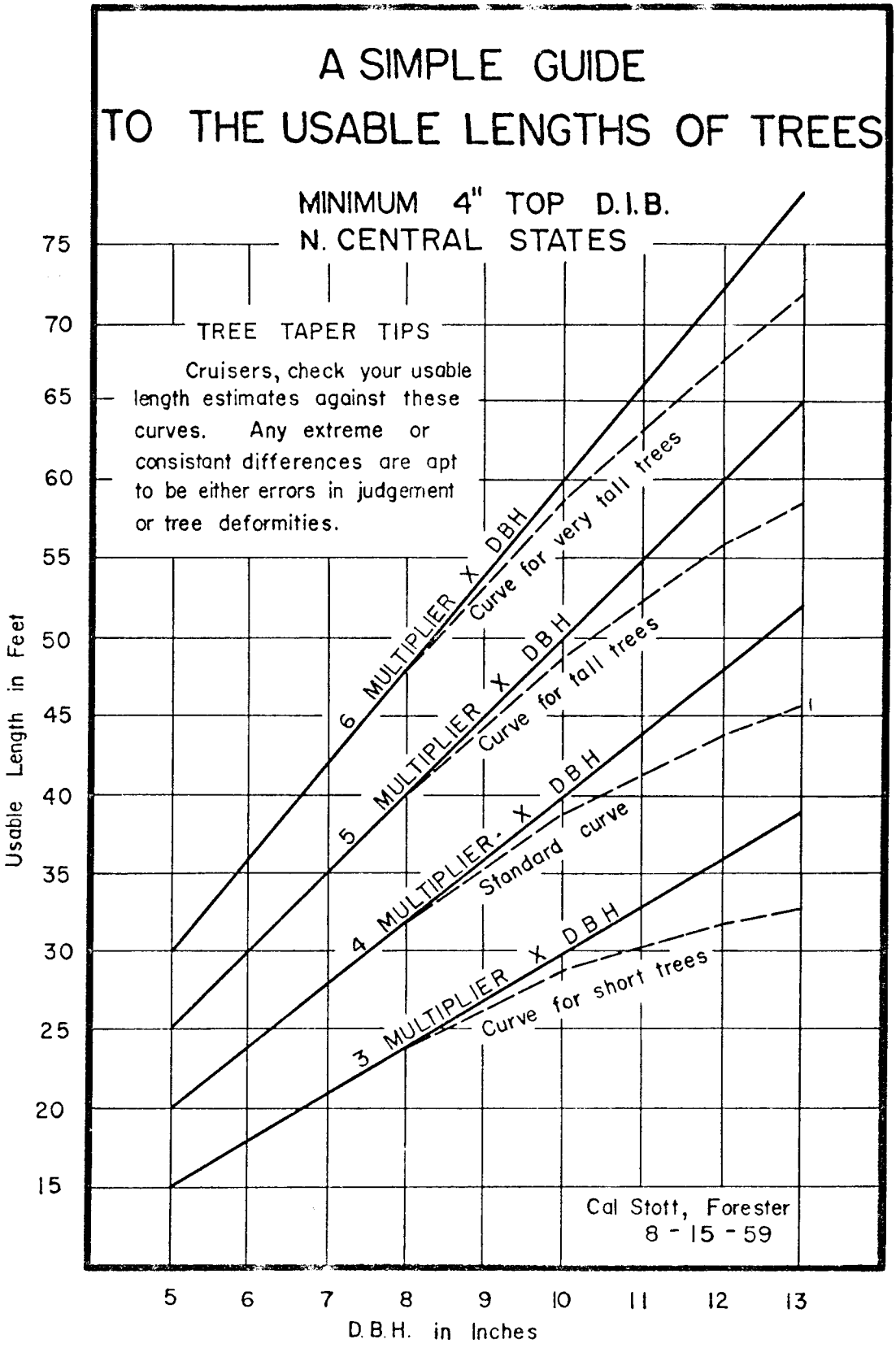
DBH	DIB AT 8 FEET			DIB AT 16 FEET			DIB AT 24 FEET			DIB AT 32 FEET			DBH
	FORM CLASS			FORM CLASS			FORM CLASS			FORM CLASS			
	Good	Fair	Poor	Good	Fair	Poor	Good	Fair	Poor	Good	Fair	Poor	
9.0	7.5	7.1	6.7	7.1	6.8	6.3	6.7	6.4	5.9	6.3	5.9	5.5	9.0
10.0	**8.3**	7.9	7.4	7.9	7.5	7.0	7.4	7.1	6.6	7.0	6.6	6.1	10.0
11.0	**9.1**	**8.7**	**8.1**	**8.7**	**8.3**	7.7	**8.2**	7.8	7.3	7.7	7.3	6.7	11.0
12.0	10.0	**9.5**	**8.9**	**9.5**	**9.0**	**8.4**	**8.9**	**8.5**	7.9	**8.4**	7.9	7.3	12.0
13.0	10.8	10.3	**9.6**	10.3	**9.8**	**9.1**	**9.7**	**9.2**	**8.6**	**9.1**	**8.6**	8.0	13.0
14.0	11.6	11.1	10.4	11.1	10.5	**9.8**	10.5	**9.9**	**9.2**	**9.8**	**9.2**	**8.5**	14.0
15.0	12.5	11.9	11.1	11.9	11.3	10.5	11.2	10.7	**9.9**	10.5	**9.9**	**9.2**	15.0
16.0	13.3	12.6	11.8	12.6	12.0	11.2	11.9	11.4	10.6	11.2	10.6	**9.8**	16.0
17.0	14.1	13.4	12.6	13.4	12.8	11.9	12.6	12.1	11.2	11.9	11.2	10.4	17.0
18.0	14.9	14.2	13.3	14.2	13.5	12.6	13.4	12.8	11.9	12.6	11.9	11.0	18.0
20.0	16.6	15.8	14.8	15.8	15.0	14.0	14.9	14.2	13.2	14.0	13.2	12.2	20.0
22.0	18.3	17.4	16.3	17.4	16.5	15.4	16.4	15.6	14.5	15.4	14.5	13.4	22.0
24.0	19.9	19.0	17.8	19.0	18.0	16.8	17.9	17.0	15.8	16.8	15.8	14.6	24.0
26.0	21.6	20.5	19.2	20.5	19.5	18.2	19.3	18.4	17.2	18.2	17.2	15.9	26.0

DBH	DIB AT 40 FEET			DIB AT 48 FEET			DIB AT 56 FEET		
	FORM CLASS			FORM CLASS			FORM CLASS		
	Good	Fair	Poor	Good	Fair	Poor	Good	Fair	Poor
9.0	5.9	5.4	5.0	5.4	5.0	4.5	4.9	4.5	4.0
10.0	6.5	6.0	5.6	5.9	5.5	5.0	5.4	5.0	4.4
11.0	7.2	6.7	6.2	6.6	6.1	5.5	5.9	5.5	4.8
12.0	7.8	7.2	6.7	7.1	6.6	6.0	6.5	6.0	5.3
13.0	**8.5**	7.9	7.3	7.7	7.2	6.5	7.0	6.5	5.7
14.0	**9.1**	**8.4**	7.8	**8.3**	7.7	7.0	7.6	7.0	6.2
15.0	**9.8**	**9.1**	**8.4**	**8.9**	**8.3**	**7.5**	**8.1**	7.5	6.6
16.0	10.4	**9.7**	**9.0**	**9.5**	**8.8**	**8.0**	**8.6**	**7.9**	7.0
17.0	11.1	10.3	**9.5**	10.1	**9.4**	**8.5**	**9.2**	**8.4**	7.5
18.0	11.7	10.9	10.1	10.7	**9.9**	**9.0**	**9.6**	**8.9**	7.9
20.0	13.0	12.1	11.2	11.9	11.0	10.0	10.8	9.9	**8.8**
22.0	14.3	13.3	12.2	13.1	12.1	11.0	11.9	10.9	**9.7**
24.0	15.6	14.5	13.4	14.3	13.2	12.0	13.0	11.9	10.6
26.0	16.9	15.8	14.6	15.4	14.4	13.0	14.0	13.0	11.4

Top diameters for the tall trees of small DBH are somewhat conservative.

Cal Stott
Forester
1-19-60


A SIMPLE GUIDE
TO THE USABLE LENGTHS OF TREES
MINIMUM 4" TOP D.I.B.
N. CENTRAL STATES
TREE TAPER TIPS
Cruisers, check your usable length estimates against these curves. Any extreme or consistant differences are apt to be either errors in judgement or tree deformities.
6 MULTIPLIER X D.B.H.
Curve for very tall trees
5 MULTIPLIER X D.B.H.
Curve for tall trees
4 MULTIPLIER X D.B.H.
Standard curve
3 MULTIPLIER X D.B.H.
Curve for short trees
Cal Stott, Forester
8 - 15 - 59
Usable Length in Feet
75
70
65
60
55
50
45
40
35
30
25
20
15
5
6
7
8
9
10
11
12
13
D.B.H. in Inches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Curve for short trees
Cal Stott, Forester
8 - 15 - 59
Usable Length in Feet
75
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D.B.H. in Inches